

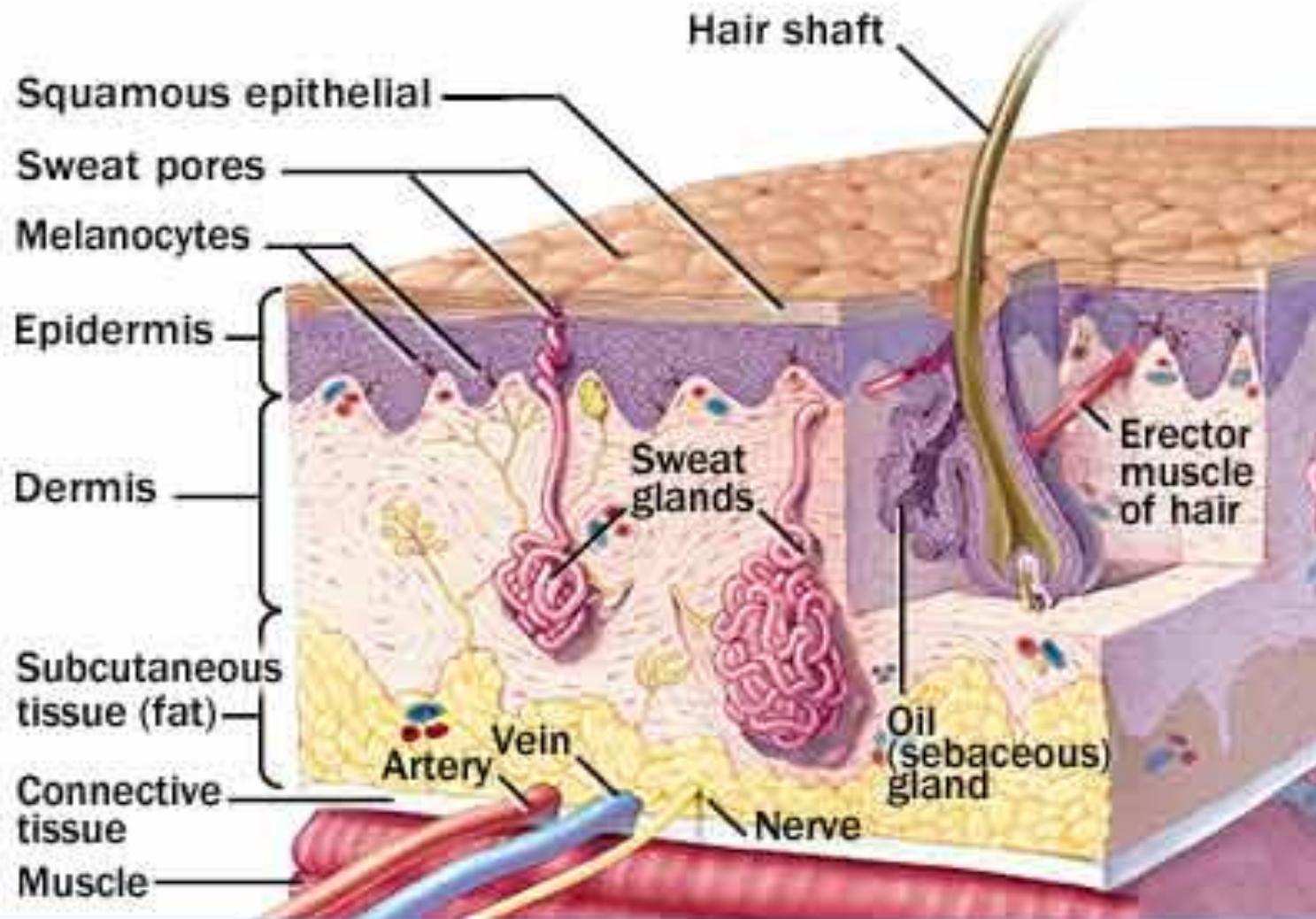
# **Integumentary System**

Protective Covering and  
First Line of Defense

# INTEGUMENTARY SYSTEM

- Skin
  - Called a membrane because it covers the body
  - Called an organ because it consists of several kinds of tissues
    - Largest organ in the body
  - Called a system because it has organs and other parts that work together for a particular function
- Hair
- Nails

# SKIN



# **FUNCTIONS**

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- Protection
- Sensory perception
- Regulation of body temperature
- Storage
- Absorption
- Excretion
- Production

# Skin Trivia

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- 21 Square Feet
- 4 Kilograms/9 pounds
  - 7% - 15% of Total Body Weight
- Complex Combination of Tissues
- Continuous Layer

# One Square Inch Contains

- 20 Blood Vessels
- 65 Hairs & Hair Muscles
- 78 Nerves
- 78 Sensors for Heat
- 13 Sensors for Cold
- 160 Sensors for Pressure
- 100 Sebaceous/Oil Glands
- 1300 Nerve Endings
- 19,500,000 Cells
- 0.5 Million Cells Dying & Being Replaced

# LAYERS OF THE SKIN

- Epidermis
  - Mostly superficial
  - Complete regeneration every 35-45 days
  - Thinner on scalp and armpit than on sole of foot
- Dermis
  - Tough, leathery, fibrous connective tissue
  - Wrinkling of elderly = loss of elastin and subcutaneous fat
- Subcutaneous- Hypodermis
  - Mostly fat
  - Anchors skin to underlying structures

# GLANDS OF THE SKIN

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- **Sudoriferous - Sweat glands**
  - 2.5 million per person
  - Cover entire skin surface except for nipples and parts of external genitalia
- **Sebaceous - Oil glands**
  - Location: all over the body except for palms and soles of feet
  - Secretion: sebum, oily substance
  - Function: smooth and soften hair and skin; slows water loss during dry weather

# GLANDS OF THE SKIN

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- Ceruminous
  - Location: outer ear
  - Secretion: earwax/cerumen
- Mammary
  - Secrete milk from breasts after giving birth

# Hair and Nails

- Nails
  - Dead epidermal cells
  - Grows under the lunula (white portion) of nailbed
  - Cells replace if nailbed is healthy
- Hair
  - Shaft: projects from the skin
  - Root: embedded in the skin; shape determines whether hair is straight or curly
  - Pigment depends on melanocytes located in the follicle

# SKIN COLOR

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## Melanin

- Brownish-black pigment
- Leads to black, brown or yellow skin, depending on racial origin
- Absorbs UV light to tan the skin
- Small concentrated areas- freckles

# SKIN ERUPTIONS

- Macules
  - Flat spots; freckles
- Papules
  - Firm, raised areas; pimples, syphilis
- Vesicles
  - Blisters or sacs filled with fluid; chicken pox
- Pustules
  - Sacs filled with pus; acne, pimples
- Crusts
  - Areas of dried pus and blood; scabs
- Wheals
  - Itchy elevated areas; hives, insect bites
- Ulcer
  - Deep loss of skin surface that may extend into dermis

# COMMON INJURIES

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- Abrasion
- Incision
- Laceration
- Puncture
- Avulsion
- Amputation
- Bruises
- Blisters
- Severe Bleeding
- Burns

# Common Diseases

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- Acne
  - Dermatitis
  - Impetigo
  - Vitiligo
  - Cancer
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# ACNE

- Occurs when the hair follicles of the skin become plugged with oil and dead skin cells
  - Whitehead
    - plug may block the pore, causing the follicle wall to bulge
  - Blackhead
    - the pore stays open and traps dirt, the top surface of the plug may darken,
- Pimples
  - Raised red spots with a white center that develop when blocked pores become inflamed or infected
- Cysts
  - Blockages and inflammation that develop deep inside hair follicles producing lumps beneath the surface of the skin

# ACNE TREATMENT

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- Treatments work by
  - reducing oil production
  - speeding up skin cell turnover
  - fighting bacterial infection
- Or doing all three
- Treatments for acne
  - **Lotions**
  - **Antibiotics or other medications**
  - **Oral contraceptives**
  - **Cosmetic surgery**

# DERMATITIS

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- Also called eczema
  - An inflammation of the skin
  - Involves swollen, reddened and itchy skin.
  - Common, not life-threatening and not contagious.
  - Can make one feel uncomfortable and self-conscious

# IMPETIGO



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- Occurs when bacteria enter the skin through cuts, scrapes or insect bites,
- Starts as a red sore that quickly ruptures, oozes for a few days and then forms a yellowish-brown crust that looks like honey or brown sugar
- Highly contagious - infection may spread to other parts of the body and to other people
- Treated with an antibiotic ointment or oral antibiotics

# VITILIGO

- Condition in which the skin loses its pigment cells
  - Results in white patches that appear on the skin in different areas of the body
  - May appear at any age but most often occurs before age 50
- The cause is not clear
  - May be due to an immune system disorder
  - Increased incidence of vitiligo in some families
- No treatment for this disorder has proved effective in all cases

# VITILIGO



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# SKIN CANCER

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- The abnormal growth of skin cells
- Most common form of cancer diagnosed
- Doctors diagnose skin cancer in approximately 1 million Americans each year
- About 9,800 Americans die annually of skin cancer

# SKIN CANCER

- All three types of skin cancer are on the rise.
  - Fair-skinned people who live in areas that get a lot of sunshine are at greatest risk
- Most commonly caused by overexposure to ultraviolet radiation from the sun
- Preventable by limiting or avoiding exposure to UV radiation and by detecting changes in skin at an early stage

# SKIN CANCER

## SIGNS AND SYMPTOMS

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- A change on the skin is the most common warning sign of skin cancer
  - Can appear suddenly, or it can develop slowly.
  - May appear as a small growth or as a sore that bleeds, crusts over, heals and then reopens.
- Develops mainly on areas of skin exposed to a lot of sun, including your scalp, face, lips, ears, neck, chest, arms and hands, and on the legs in women
- First sign of melanoma may be a change in an existing mole or the development of a new, suspicious-looking mole

# Three major types of skin cancer

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- Basal cell & Squamous cell
  - Both are superficial, slow growing and highly treatable, especially if found early
- Melanoma
  - A more serious form of skin cancer
  - Affects deeper layers of the skin and has the greatest potential to spread to other tissues in your body

# SKIN CANCER



- **Basal cell cancer**

- A pearly or waxy bump on your face, ears or neck
- A flat, flesh-colored or brown scar-like lesion on your chest or back

- **Squamous cell cancer**

- A firm, red nodule on your face, lips, ears, neck, hands or arms
- A flat lesion with a scaly, crusted surface on your face, ears, neck, hands or arms

# Mole or Melanoma?



Mole



Melanoma

- Melanoma is the least common but most dangerous skin cancer. It can develop anywhere on your body at any age.
- A large brownish spot with darker speckles
- A simple mole that changes in color or size or consistency
- A small lesion with an irregular border and red, white, blue or blue-black spots

# SCALP CANCER

- Squamous cell cancer
- Basal cell cancer
- Melanoma
- Doctor should check any lesion that:
  - Has color
  - Grows rapidly
  - Bleeds
  - Gets irritated



# Tanning beds: Are they safer than the sun?

- Both sunlight and tanning beds raise the risk of skin cancer and premature skin aging.
- Exposure to ultraviolet (UV) radiation — found in sunlight and tanning beds — damages skin.
- The UV source used in tanning beds gives off high doses of UVA — up to three times more than in sunlight.
- Also, the UV light from tanning beds may:
  - Cause eye burns if protective eyewear is not used.
  - Worsen some chronic conditions such as lupus and diabetes.

# BURNS

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- **First degree**
- **Second degree**
- **Third degree**

# Severe Burns

- Main causes of death due to burns include
  - Bacterial infection
  - Severe loss of body fluids from the burned surface
  - Dehydration, which can impair circulation and blood supply to vital organs and lead to kidney failure
- Burn centers provide specialized care for people who are badly burned

# BLISTERS

- Keep intact - unbroken skin over a blister provides a natural barrier to bacteria and decreases the risk of infection
- If the blister is painful
  - Wash the blister with warm water and soap.
  - Swab the blister with rubbing alcohol. Sterilize a clean, sharp needle by wiping it with rubbing alcohol.
  - Use the needle to puncture the blister. Aim for several spots near the blister's edge.
  - Let the fluid drain, but leave the overlying skin in place.
  - Apply an antibiotic ointment to the blister and cover with a bandage.

# BRUISE

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- Forms when a blow breaks small blood vessels near your skin's surface, allowing a small amount of blood to leak out under your skin
- Trapped blood appears as a black-and-blue mark
  - If the skin isn't broken, you don't need a bandage.
  - Elevate the injured area.
  - Apply ice or a cold pack for 30 to 60 minutes at a time for a day or two after the injury.

# ANIMAL BITES

- **For minor wounds.**
  - If the bite barely breaks the skin, treat it as a minor wound.
  - Wash the wound thoroughly with soap and water
  - Apply an antibiotic cream to prevent infection
  - Cover the bite with a clean bandage.
- **For deep wounds.**
  - If the bite creates a deep puncture of the skin or the skin is badly torn and bleeding,
  - Apply pressure to stop the bleeding and see the doctor
- **For infection.**
  - If signs of infection such as swelling, redness, increased pain or oozing occur, see the doctor immediately.
- **For suspected rabies.**
  - If you suspect the bite was caused by an animal that might carry rabies — any bite from a wild or domestic animal of unknown immunization status — see the doctor immediately

# HUMAN BITES

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- Treatment of a human bite that breaks the skin
  - Stop the bleeding by applying pressure.
  - Wash the wound thoroughly with soap and water.
  - Apply an antibiotic cream to prevent infection.
  - Apply a clean bandage.
  - Get emergency medical care.
  - A tetanus booster shot, if more than ten years

# INSECT BITES AND STINGS

- **For mild reactions:**
  - Try to remove the stinger
  - Swab the site with disinfectant.
  - Apply hydrocortisone cream, calamine lotion or a baking soda paste
  - Give victim an antihistamine
- **For severe reactions:**
  - Severe reactions may progress rapidly.
  - Dial 911 or call if any of the following signs or symptoms:
    - Difficulty breathing
    - Swelling of the lips or throat
    - Faintness, confusion, rapid heartbeat
    - Hives
    - Nausea, cramps and vomiting

# HIVES

- Also known as **urticaria**
  - Raised, red, often itchy welts (wheals) of various sizes that appear and disappear on the skin.
- Angioedema, a similar swelling, causes large welts deeper in the skin, especially near the eyes and lips
  - Affects about one in five people
  - Can be life-threatening if swelling causes the throat or tongue to block airway and lead to loss of consciousness.
- Hereditary angioedema (HAE)
  - Uncommon, inherited disorder, which can cause sudden, severe and rapid swelling of the face, arms, legs, hands, feet, genitalia, digestive tract and airway.

# HEATSTROKE

- Main sign of heatstroke is an elevated body temperature — generally greater than 104 F
- Changes in mental status ranging from personality changes to confusion and coma.
- Skin may be hot and dry, although in heatstroke caused by exertion, the skin is usually moist.
- Other signs and symptoms may include:
  - Rapid heartbeat
  - Rapid and shallow breathing
  - Elevated or lowered blood pressure
  - Cessation of sweating
  - Irritability, confusion or unconsciousness
  - Fainting, which may be the first sign in older adults